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Patient-Centered Education to Improve Health Outcomes of
Adult Jamaicans with Diabetes

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Abstract

There is a 42% prevalence of diabetes among Jamaicans (Ministry of Health, Jamaica Health and Lifestyle Survey, 2018). The survey found that Jamaicans will continue to face challenges of diabetes and its complication as approximately four out of ten Jamaicans are unaware that they have diabetes, and thus delay receiving healthcare.

Limited health literacy is predominant among the diabetic Jamaican population and negatively affects health outcomes (Singh & Aiken, 2017). Jamaicans were found to have poor knowledge of diabetes; in particular, they had difficulty identifying clinical signs of hyper/hypoglycemia, the importance of examining eyes and feet for abnormalities, normal fasting blood glucose levels, and complications of diabetes (Hartzler, Chen, Murphy & Rodewald, 2014).

A literature review was conducted to identify research studies and systematic reviews that evaluated the effectiveness of patient-centered diabetic education that uses shared decision-making and cultural humility in improving health literacy, with Jamaicans with T2DM. The results of this review are critically appraised and summarized.

Keywords: Diabetes, cardiovascular complications, positive outcomes, collaborate, adapt, educator, empowerment, patient-centered approach.

Using Patient-Centered Education to Improve Health Outcomes of Adult Jamaicans with Diabetes

Introduction

Diabetes mellitus is the second leading cause of death in Jamaica and the second leading cause of loss of limbs. Statistics obtained from the Ministry of Health, Jamaica (2018) indicate a 42% increase in the prevalence of diabetes in the last 18 years. Approximately 236,200 Jamaican have diabetes, which is one in every eight Jamaicans. The prevalence is higher among Jamaican women than men.

Jamaicans were found to have inadequate awareness of diabetes, in particular they had problems identifying “signs and symptoms of hyper/hypoglycemia, the importance of foot and eye exams, fasting blood glucose levels, and long-term diabetes complications” (Hartzler et al., 2014, p. 1). Jamaican patients rely on healthcare providers for diabetes information and self-management recommendations (Hartzler et al., 2014). Health literacy affects diabetes management, and according to Singh and Aiken (2017), limited health literacy is predominant among the diabetic Jamaican population, and this affects their health outcomes.

Patient-centered education is a powerful tool that can be used to empower the Jamaican population with diabetes to better manage their disease and avoid serious complications. According to Titchener (2014), a patient-centered approach to providing care to those with diabetes can improve health outcomes. Diabetic teaching that is patient-centered focuses on providing education that includes cultural preferences, physical ability, availability of healthy foods, housing, the environment, socioeconomic status, availability of transportation, accessibility to healthcare services, and health literacy (Titchener, 2014).

Although a patient-centered approach to nursing was introduced over 40 years ago, it has been recognized that the positive outcomes in providing care uniquely tailored to the client have

not been fully adopted in the clinical setting. The purpose of this manuscript is to provide a summary of evidence-based literature on the effectiveness of patient-centered diabetic education.

PICO Question

In Jamaican patients with diabetes (P), does patient-centered diabetic education that uses shared decision-making and cultural humility (I) compared to generic types of diabetic education (C) achieve increased diabetic health literacy and improve health outcomes (O)?

Methods

A review of the literature was conducted to include research articles, peer-reviewed journals, meta-analysis, and systematic reviews. The strategy was guided by the PICO question using the keywords “diabetes mellitus, type 2” AND “patient engagement” OR “shared decision” OR “health literacy.” This was a comprehensive computer-assisted search for English-language articles in five electronic databases: Cumulative Index to Nursing and Allied Health Line (CINAHL), PubMed, Cochrane Database of Systematic Reviews, American College of Physicians (ACP) Journal Club, and Evidence-Based Medicine Journals. The search was restricted to journals published between 2014 and 2019, and over 400 articles relating to one or more of the keywords were found. The search was further limited to include usual care, improved HbA1c, and improved patient outcome and awareness. These criteria reduced the number of articles, and six peer-reviewed articles were selected for further evaluation. Articles were selected if they included the following content: collaborative care management, patient-centered clinical approach to diabetes care, and the impact of educational interventions in improving patient outcomes and awareness.

The articles chosen were evaluated using the John Hopkins Nursing Evidence-Based Practice Appraisal Tools and rated as either good or high quality (Dang, & Dearholt, 2018). The results of this critical appraisal are displayed in an evaluation table (see Appendix A).

Results

Global Prevalence and Incidence of Diabetes

Diabetes mellitus and its related complications have continued to be a global issue with its risk factors affecting health and human well-being (WHO – Diabetes Country Profiles, 2016). The International Diabetes Atlas noted that the prevalence of diabetes is projected to increase globally by 48%, from 425 million in 2017 to 629 million in 2045 (Cho et al., 2018). Africa is projected to be significantly affected, with an expected increase of 156% from 2017 to 2045. The Middle East and North Africa follow with a projected increase of 110%. North America and the Caribbean are also expected to see an increase of 35% (Cho et al., 2018).

The incidence of diabetes has been increasing annually, and although evidence-based research and technology are advancing, diabetes-related complications remain a challenging issue. Diabetes is more prevalent in ethnic minority groups such as Blacks, Black Americans, Alaskan natives, Native Americans, and Latinos. This group accounts for approximately 12-15% of the total population diagnosed with diabetes. Specifically, the American Diabetes Association (2018) reported that Blacks are the second ethnicity most affected by diabetes and its debilitating complications (12.7%). Asian Americans and Caucasians account for approximately 9% of the population with diabetic-related illnesses (Menezes, Lopes, & Nogueira, 2016).

Definition and Types of Diabetes

Diabetes is a chronic condition that occurs when there is an increase in glucose levels in the blood as the body is not producing adequate insulin, or the body is unable to use insulin effectively. The body's inability to regularize glucose levels in the blood system results in hyperglycemia or hypoglycemia. The body's inability to regularize glucose levels in the blood

system results in hypoglycemia and hyperglycemia. Irregular blood glucose levels in the blood system result in diabetes-related complications (Cho et al., 2018).

A diabetes diagnosis can be prediabetes, gestational, Type one diabetes (T1DM), or T2DM (ADA, 2018). Prediabetes is diagnosed when the blood glucose levels are higher than usual but is not high enough to be diagnosed as diabetes (ADA, 2018). Gestational diabetes happens to millions of women during pregnancy, but this does mean the mother has diabetes (ADA, 2018). Gestational diabetes occurs during pregnancy when the body's hormones cause the body to become insulin resistant (ADA, 2018). While in T1DM, the body does not produce insulin, in T2DM, the most common among diabetes diagnoses, the body produces insulin, but it does not use insulin properly in regulating the blood glucose levels (ADA, 2018).

Complications of Diabetes

Complications of diabetes constitute a significant challenge for both patients and their families. Diabetes-related diseases are disabling and present life-threatening health complications such as vascular disorders, neuropathy, cardiovascular disease, limb amputations, retinopathy, blindness, renal complications, as well as psychological issues. These complications contribute to frequent hospital visits, re-hospitalizations, and increased health care costs. Additionally, complications affect the patients and their families, psychologically, physiologically, and financially (WHO, 2016).

Patient-Centered Intervention

A patient-centered approach to patient education introduces individualized patient education that considers the unique attributes, culture, and socio-economic factors that influencing compliance. Titchener (2014) conducted a study to determine if a specific patient-centered intervention to patient education would improve the long-term reduction in HbA1c

values in diabetic patients. The study used before and after audits to compare HbA1c baselines to determine if there was a change (Titchener, 2014). The results of the audit suggest that a patient-centered approach will clinically influence patient compliance with managing their health and will result in a reduction in HbA1c scores (Titchener, 2014).

Health Literacy

Improvement in patient outcomes is dependent on the importance of how knowledgeable patients are on their diagnosis and health management. Menezes et al. (2016) and Fan, Huang, Tang, Han, Dong, and Wang (2016) conducted a literature review and research, respectively, to evaluate the effect of individualized patient education on diabetes management and patient outcomes. The aim was to obtain whether patient education interventions reduced HbA1c values and metabolic and vascular diabetic complications in adults with diabetes. Menezes's literature review included Latin America, Caribbean Literature on Health Sciences, and Cuba Medicine, among others. Fan et al. (2016), evaluated the effect of a patient-centered education that was designed and developed by nurse educators, dietitians, and clinical psychologists and patient outcome. The results from both articles suggest that individualized education programs that include the uniqueness of the patient offer better health management and outcomes for diabetic patients (Fan et al., 2016; Menezes et al., 2016).

Shared Decision-Making

Shared decision-making is important in providing patient-centered care. There is no single way of managing a disease process, as the quality of the outcome is often dependent on the uniqueness of the individual, and the social determinants that may influence the results. The shared decision allows the healthcare providers and the patient to agree on a care plan that the

patient understands and one that will encourage compliance (“Shared Decision making – Health IT” 2013).

Two studies evaluated the effects of Diabetes Self-Management Education (DSME) on the effects of patient outcome (Klein, Jackson, Street, & Whitacre, 2013; Yuan et al., 2014). The researchers of both studies agreed that the intervention of DSME programs improved patient collaboration in their care, which was reflected in improved HbA1c scores. The improvement in HbA1c scores reflected an improvement in diabetes management over the past two to three months.

Cultural Humility

Cultural humility encourages the healthcare provider to see beyond an intellectual knowledge of culture in order to truly relate to the culture through the experience of the patient (Miller, 2009). It should not be assumed that all members of a culture conform to a single conventional image. It is important to appreciate that one’s perspective is limited and can be prejudiced by assumptions that can influence and affect interactions with a different culture. Healthcare providers should be mindful that each person remains an individual and should be treated accordingly.

Xuereb, Anderson-Johnson, Ragoobirsingh and Morrison (2014) conducted a research study to evaluate the impact of using the “Protocol for the Nutritional Management of Obesity, Diabetes, and Hypertension in the Caribbean” as a training tool to improve the quality of care delivered to patients with T2DM in Jamaica, Guyana, Belize, St Vincent, and the Grenadines, and Suriname. Training workshops were led by the Caribbean Food and Nutrition Institute (CFNI) in conjunction with the national nutrition experts from the respective countries (Xuereb et al., 2014). The research was aimed at ensuring that the healthcare participants were

knowledgeable about diabetes, hypertension, obesity, and health management. The healthcare providers who participated in the research had first-hand knowledge of the culture and could relate and tailor the plan of care to be relevant to the patient. Also, CFNI included the role of nutrition in the management of diabetes, hypertension, and obesity in health management. The training considered the foods that are unique to the culture. Researchers found an improved patient outcome when the patients' plan of care included diet and nutrition, tailored to the diagnosis, during patient counseling. This change of practice improved patient outcomes through health literacy and shared decision making.

Conclusion

The overall consensus of the evidence reviewed suggests that providing patient centered health education that includes the idiosyncrasies of the client can improve health literacy and the health outcomes of people with diabetes. This evidence-based literature review also found that cultural humility can affect similar positive changes. All healthcare providers must embrace this method and move away from the generic type of patient education for T2DM. Using a shared decision-making approach that centers on the patient's unique needs can reduce the number of serious diabetes complications.

Positive outcomes may be achieved when educational interventions include establishing client-focused relationships between clinicians and clients. Rather than the clinician functioning as a decision-maker for clients, more positive outcomes are attained when clinicians collaborate with the client and adopt the role of an educator and facilitator. This position of partnering with clients empowers them to take control of managing their disease. Introducing a patient-centered clinical approach to caring for diabetics and pre-diabetics is cost-effective and improves the quality of health outcomes for those with T2DM.

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Appendix A

Table 1: Evaluation Table

Citation	Conceptual Framework	Sample/ Setting	Major Variables studied	Measurement/ Data Analysis	Findings	Appraisal Worth to Practice
Fan, M., Huang, B., Tang, Y., Han, X., Dong, W., & Wang, L. (2016). Effect of individualized diabetes education for type 2 diabetes mellitus: A single-center randomized clinical trial. <i>African Health Sciences</i> , 16(4), 1157-1162. doi:10.4314/ahs.v16i4.34	<p>Design: Randomized clinical trial</p> <p>Timeframe: October 2008 – October 2010</p> <p>Keywords: Individualization; type 2 diabetes; health education; blood glucose; blood pressure</p>	<p>Sample: 280 participants were randomly selected.</p> <p>Setting: Hospital</p>	Body mass index; waist circumference; fasting blood glucose; systolic blood pressure; triglyceride; low-density lipoprotein	SPSS v 13.0 was used for the statistical analysis. Fisher's exact test was used for the comparison of categorical data. $P < 0.05$ was considered statistically significant.	<p>Individualized education which include personality show improved blood glucose levels, cardiovascular issues such as BMI, and blood pressure.</p> <p>Result: HbA1c ($6.2 \pm 0.6\%$ vs $6.9 \pm 3.1\%$, $P=0.03$), BMI (21.5 ± 2.5 vs 23.6 ± 1.6 kg/m², $P=0.002$), BP(130.1 ± 8.8 vs 135.1 ± 8.4 mmHg, $P=0.003$),</p>	<p>Strengths: The sample of participants was appropriate for the study, and they were randomly divided into study and control groups. The recommendations were consistent and included scientific references.</p> <p>Limitations: Medication adherence was not captured in the project to observe its influence on the patient's outcome.</p> <p>Critical Appraisal Tool & Rating: John Hopkins Nursing Evidence-Based Practice Appraisal Tools Level I, Grade A, Quality High</p>

Citation	Conceptual Framework	Sample/ Setting	Major Variables studied	Measurement/ Data Analysis	Findings	Appraisal Worth to Practice
<p>Helen Altman Klein, Sarah M. Jackson, Kenley Street, James C. Whitacre, & Gary Klein. (2013). Diabetes self-management education: Miles to go. Nursing Research and Practice, 2013, 581012-15. doi:10.1155/2013/581012</p>	<p>Design: Meta-analysis of randomized clinical trials journals</p> <p>Timeframe: Articles published 2005 through 2009</p> <p>Keywords: Diabetes mellitus; patient education; educational intervention; self-management education; psychological therapies; clinical trials.</p>	<p>Sample: 52 studies with a total of 9,631 participants included in the analysis</p>	<p>Participants who completed DSME interventions; adults diagnosed with T2DM; HbA1c values available both baseline and post-intervention.</p>	<p>The titles and abstracts were assessed for relevance. The criteria for inclusion: participants who completed DSME; diagnosed with T2DM by NIH; HbA1c available pre and post intervention; RCTs journals.</p>	<p>The intervention group showed overall reductions in HbA1c from baseline to post-intervention. Results: Mean HgbA1c in the intervention group (M=7.7.61, SD=1.34) < control (M=8.18, SD=1.43, t(146) = 3.51, P<0.01</p>	<p>Strengths: The controls were adequate, and the sample size was sufficient for the design. The recommendations that were presented was consistent, based on the comprehensive literature reviews that included scientific references.</p> <p>Limitations: Some studies had high attrition rates and may be biased as the authors may be less likely to submit null findings.</p> <p>Critical Appraisal Tool & Rating: John Hopkins Nursing Evidence-Based Practice Appraisal Tools Level II, Grade B, Quality High</p>

Citation	Conceptual Framework	Sample/ Setting	Major Variables studied	Measurement/ Data Analysis	Findings	Appraisal Worth to Practice
<p>Menezes, M., Lopes, C., & Nogueira, L. (2016). Impact of educational interventions in reducing diabetic complications: A systematic review. Revista Brasileira De Enfermagem, 69(4), 726-737. doi:10.1590/0034-7167.2016690422i</p>	<p>Design: Systematic review of five randomized clinical trials and six quasi-experimental</p> <p>Timeframe: Studies published between 2004 through 2014</p> <p>Keywords: Diabetic health education; diabetic complications; diabetes type 1, diabetes type 2; efficacy-effectiveness of interventions</p>	<p>Sample: Eleven studies (five randomized clinical trials and six quasi-experimental)</p>	<p>Authors; year and country of publication; study design, sample/population size; mean age of participants; mean time evolution of DM; educational intervention performed; results, and conclusions.</p>	<p>Systematic literature review using PRISMA including primary, experimental or quasi-experimental, and quantitative studies.</p>	<p>The reviews indicate that patient-centered care and the shared decision may positively influence the patient's quality of life. Results: 58% of 98 patients developed no new foot ulcers, recurrence of neuropathic lesion: 16.7 vs 83.3, $p=0.119$, blood glucose level 128.8 ± 41.0 vs 174.4 ± 50.1, $p<0.001$.</p>	<p>Strengths: The sample size was sufficient for the design and the controls were adequate. The recommendations that were presented in the conclusion was consistent, based on the comprehensive literature reviews that included scientific references.</p> <p>Limitations: There was no similarity in the designs of the educational interventions.</p> <p>Critical Appraisal Tool & Rating: John Hopkins Nursing Evidence-Based Practice Appraisal Tools Level II, Grade B, Quality High</p>

Citation	Conceptual Framework	Sample/ Setting	Major Variables studied	Measurement/ Data Analysis	Findings	Appraisal Worth to practice
Titchener, J. (2014). A patient-centered clinical approach to diabetes care assists long-term reduction in HbA1c. Journal of Primary Health Care, 6(3), 195-202	<p>Design: Quantitative Research</p> <p>Timeframe: Conducted between 2008 – 2010.</p> <p>Keywords: Chronic disease; clinical audit; diabetes mellitus; patient-centered care; self-management</p>	185 patients were referred to a patient-centered intervention for diabetes management.	HbA1c was the major primary clinical outcome that was measured in the study.	The data were analyzed using the Statistical Package for the Social Sciences (SPSS).	The results indicated that the introduction of individualized patient-care and education positively impacts behavioral changes which are further reflected in the improvement in HgbA1c values.	<p>Strengths: The results were fairly consistent, the sample size was sufficient, and the conclusion provided consistent recommendations.</p> <p>Limitation: There was no control group, and the participants were not randomly selected.</p> <p>Critical Appraisal Tool & Rating: John Hopkins Nursing Evidence-Based Practice Appraisal Tools Level II, Grade A, Quality Good</p>

Citation	Conceptual Framework	Sample/ Setting	Major Variables studied	Measurement/ Data Analysis	Findings	Appraisal Worth to Practice
<p>Yuan, C., Lai, C. W. K., Chan, L. W. C., Chow, M., Law, H. K. W., & Ying, M. (2014). The effect of diabetes self-management education on body weight, glycemic control, and other metabolic markers in patients with type 2 diabetes mellitus. <i>Journal of Diabetes Research</i>, 2014, 789761. doi:10.1155/2014/789761</p>	<p>Design: Blocked randomization was used in the study</p> <p>Timeframe: Three-month intervention</p>	76 patients with T2DM	Blood pressure, body weight, lipid profile, blood glucose, HbA1c, and carotid arterial stiffness.	<p>Shapiro-Wilk test was used to verify the normality of the distribution. The <i>t</i>-test was used for normal distribution, otherwise the nonparametric test was applied. Significance $P < 0.05$.</p>	<p>The results indicated a significant decrease in the HbA1c level and body weight in the intervention group when compared to the control group. Results: reduction in hemoglobin A1c (HbA1c, $-0.2 \pm 0.56\%$ versus $0.08 \pm 0.741\%$; $P < 0.05$) and body weight (-1.19 ± 1.39 kg versus -0.61 ± 2.04 kg; $P < 0.05$). DSME can improve HbA1c and body weight in patients with type 2 diabetes.</p>	<p>Strengths: The sample of participants was appropriate for the study, and they were randomly divided into study and control groups. The recommendations were consistent with scientific references.</p> <p>Limitations: The timeline for baseline and follow-up assessment was short, other metabolic markers associated with DSME was not included, and the long-term effect of low intensity education was not fully evaluated</p> <p>Critical Appraisal Tool & Rating: John Hopkins Nursing Evidence-Based Practice Appraisal Tools Level I, Grade A, Quality High</p>

Citation	Conceptual Framework	Sample/ Setting	Major Variables studied	Measurement/ Data Analysis	Findings	Appraisal Worth to Practice
<p>Xuereb, G., Anderson-Johnson, P., Ragoobirsingh, D., & Morrison, E., (2014). Impact of a Program to Improve Quality of Diabetes Care in the Caribbean. <i>Journal of Research in Diabetes</i>, 1–13. doi: 10.5171/2014.149397</p>	<p>Design: Randomization was used in the study</p> <p>Timeframe: Two-and-a-half-day training workshop</p>	133 healthcare professionals	Height, weight, body mass index, waist measurement, hip measurement, capillary blood glucose, HBA1c, cholesterol panel, blood pressure, diet and physical activity.	<p>Medical chart audit were analyzed using a McNemar test to establish statistical significance in the change.</p> <p>Confidence Interval 95%.</p>	<p>The results indicated an overall improvement in documenting the care provided and the inclusions of medico-social data, nutrition and the importance of physical activity in counseling and providing patientcare.</p>	<p>Strengths: The sample of participants was appropriate and were randomly selected. The recommendations were consistent with scientific references.</p> <p>Limitations: The lack of human resources and medical equipment affected compliance in some countries. The research did not include how the impact of program improved patient's outcome.</p> <p>Critical Appraisal Tool & Rating: John Hopkins Nursing Evidence-Based Practice Appraisal Tools Non-research - Level IV, Quality High</p>